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ABSTRACT

The Evaluation and Assessment Laboratory at the University of Alabama (Tuscaloosa) has contracted with the Georgia Department of Education (GDOE) to develop a microcomputer-based data management system for use in applying evaluation standards to schools and school systems. The Comprehensive Evaluation System (CES) was implemented statewide and has been revised and updated over a 5-year period. The initial development and subsequent changes in hardware and software are traced, illustrating accommodations to changes in statewide evaluation procedures. A legislative mandate in 1984 directed the GDOE to develop a computerized database management system for evaluation use. A preliminary version of the CES was developed in 1986, field tested in 1988, revised, converted to dBase IV, and tested again in 1989. Hardware and software were installed in fall 1990, after ironing out compatibility problems. A local area network allows the CES to include approximately 2,300 public schools and 200 school systems. The development of systems similar to the CES requires expertise in educational evaluation and computer software design. As more practitioners acquire these skills, the number of large-scale evaluation systems running on microcomputers will increase. One figure illustrates an overview of changes in statewide evaluation procedures between 1986 and 1990. (SLD)

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Using Microcomputers to Apply Statewide Standards for Schools and School Systems: Technological Changes over Five Years

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Using Microcomputers to Apply Statewide Standards for Schools and School Systems: Technological Changes over Five Years

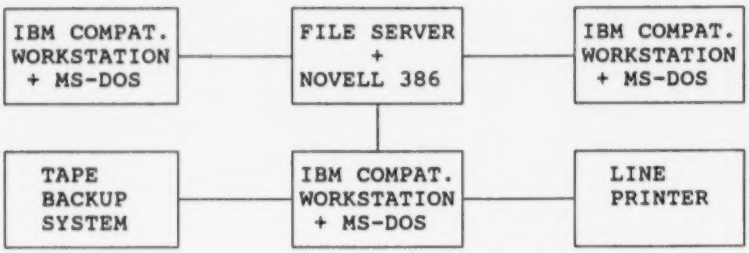
The Evaluation and Assessment Laboratory (EAL) at The University of Alabama has contracted with the Georgia Department of Education (DOE) to develop a microcomputer-based data management system for use in applying evaluation standards to schools and school systems. The system, Comprehensive Evaluation System (CES), was implemented on a statewide basis and has been revised and updated over a five year period. This paper will trace the initial development and subsequent changes in hardware and software that were effected to allow the system to accommodate changes occurring in the statewide evaluation procedures and to make the system more efficient and easier to use. The following shows the historical overview of the changes.

Initial development and demonstration to DOE personnel (1986)

Pilot test and implementation (1986-87, 1987-88, and 1988-89)

Conversion to dBASE IV (1989-1990)

Running under local area network (1990-91 to present)


IBM COMPAT. WORKSTATION + MS-DOS
FILE SERVER + NOVELL 386
IBM COMPAT. WORKSTATION + MS-DOS
TAPE BACKUP SYSTEM
IBM COMPAT. WORKSTATION + MS-DOS
LINE PRINTER

The Georgia Comprehensive Evaluation System

The Georgia Comprehensive Evaluation System (CES) was developed under legislative mandate. The Quality Basic Education Act of 1984 directed the Georgia Department of Education (DOE) to development and implement a comprehensive system of standards and indicators to be met by all schools and school systems in the state. The procedures and staffing for this undertaking were completely new and were developed by the DOE with the assistance of EAL. From the beginning, all the CES processes were designed to operate within a computerized database management environment. During the field test phase in 1986-87 and the first year of actual implementation in 1987-88, DOE field administrators conducted on-site visits to all schools and school systems in the state with the assistance of trained evaluation team members. During these team visits, data were collected using evaluation instruments developed by the DOE with the assistance of EAL. During 1986 a preliminary version of the CES computer software was developed around the draft school and school system standards and indicators of legal compliance. The menu-driven system was written in Microsoft Compiled BASIC and ran under MS-DOS on an IBM compatible microcomputer. The microcomputer installed shortly thereafter at the DOE for

running the CES software was a Wang Laboratories APC running under WANG MS-DOS. When the computer software was installed on this computer, it was discovered that it would only run if the computer was placed in "IBM emulation" mode. In this mode, several features of the computer and its ability to access WANG MS-DOS files were impeded. To increase the efficiency of the system, it was decided that the system should be modified and recompiled under WANG's version of Microsoft Compiled BASIC. Since the interfacing software required for operating the NCS 3000 optical mark reader is compiled MS-DOS code, it was not possible to modify it to allow the scanning operation to run in the computer's Wang mode. Therefore, for two years, all incoming team visit data had to be scanned and stored with the computer in IBM mode. The computer then had to be rebooted under WANG MS-DOS in order to run the CES database management and reporting system.

Beginning with the 1988-89 school year, the CES field administrators and evaluation teams began visiting only 20% of the school systems while collecting self-report data concerning legal adherence from the rest of the systems. The computer software was revised extensively to accommodate changes in the procedures and evaluation instruments and the answer sheet scanning operation was replaced by an interactive data entry module that allowed the operator to enter a batch of data quickly and accurately from the keyboard. The staff felt that the use of the microcomputer-based system for managing the CES data made the process much more efficient.

When DOE personnel decided to install a local area network within the division that handled the CES it was decided to convert the CES software to run in that environment. After discussions with department personnel who were responsible for approving computer

hardware and software destined for use within the DOE, the system was completely rewritten to run under multi-user dBASE IV. During the summer of 1989 the system was completed and tested in a single-user environment at EAL. The project was put on hold while the DOE awaited delivery of its equipment. A 386-based file server running OS-2, 3-Com Plus Networking Software, and Token Ring LAN hardware and three 286-based workstations were delivered to the DOE during the fall. Once the computer equipment was set up in a temporary configuration and the LAN software installed, EAL personnel went to Atlanta to install the CES software. During the installation visit, it became apparent that dBASE IV and the 3-Com LAN software would not work together despite initial claims from both 3-Com and Ashton-Tate that the systems were compatible. Discussions with technical consultants over a period of two days confirmed the incompatibility, but both firms insisted that the problems were with the other vendor. To insure that the DOE could begin processing data from the ongoing team visits, one of the workstations was set up with a printer and the CES software was loaded on it for use in a single-user configuration until the compatibility problem could be solved. Through negotiations between the DOE and the software vendors, it was finally decided to reject the 3-Com LAN software and adopt Novell 386. The computer equipment was permanently cabled and the Novell software was installed during fall 1990. EAL personnel configured the LAN and installed the CES software during fall 1990. Under the present configuration, the software runs on the LAN server and all CES database files are kept on the server. One workstation is directly connected to a line printer and a tape backup device and is used as the primary workstation for data entry, report generation and file maintenance (backup). The two other workstations can be used to view

and update data in the CES database and carry out other CES related activities such as word processing.

Although the Comprehensive Evaluation System was designed as a microcomputer-based data management system and continues to be such to the present, the capabilities of the system, the data management procedures, and especially the computer hardware have changed constantly over the past five years. These changes have increased the efficiency of the system as well as its ease of use.

Conclusions

Networking no longer is a privilege limited to minicomputer, main frame, and super computer. The recently released inexpensive network operating system allows the user to establish a local area network using microcomputers. The CES includes approximately 2300 public schools and 200 school systems, which requires several persons to be involved in entering data, updating databases, printing routine reports and statistical reports, and word processing. Before networking, to schedule those jobs on the single microcomputer was very inconvenient, while after networking, multiple users can now access the same database concurrently on their work stations. Both Novell NetWare and dBASE IV (network version) provide security systems which require users to login with user ID and password. Each file can be specified based on access right such as read, write, modify, and delete. Users can specify their files as shared by everyone, a group, or none. The supervisor of the network can limit directory access right to each user. All these features contribute to enhancing the security of the system. Also, users can share software on the network file server, which saves a lot of hard disk space at the work stations; they can send and receive messages inside

the local area network or communicate with and use other systems' utilities via the network.

However, it should be noted that the microcomputer-based evaluation systems described in this paper were developed by professional personnel with expertise in both educational evaluation and computer software design. While the level of microcomputer knowledge among all personnel engaged in educational evaluation is rising, much of this knowledge is limited to the use of applications software such as word processors, spreadsheets, and database programs. Thus, it would probably be unwise for an evaluator without many years of microcomputer programming experience to attempt to develop a system such as that described in this paper. While the number of microcomputer programming consultants and external agencies offering software development services is growing rapidly, most of these have no direct experience developing educational evaluation systems. The ideal solution for a state or other agency embarking on the development and implementation of a large scale microcomputer-based evaluation system is probably to attract someone with experience and training in educational evaluation and research who also has extensive experience in microcomputer programming. The necessity of using computers of all kinds within the fields of educational evaluation and research is requiring both experienced practitioners and those new to the field to acquire additional computer skills. As more practitioners acquire these skills, the number of large scale evaluation systems running on microcomputers will continue to increase.